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Marine Casualty Investigations

Enquêtes sur les accidents maritimes

Investigation Report to the Minister pursuant to sections 542 or 545 of the Canada Shipping Act

Rapport d'investigation au Ministre conformément aux articles 542 ou 545 de la Loi sur la marine marchande du Canada

Canada

Ce rapport est aussi disponible en français.

REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES ATTENDING THE STRIKING OF EAST OUTER CHANNEL LIGHT STRUCTURE NO. 1, IN THE AMERICAN SECTION OF LAKE ERIE BY THE CANADIAN TANKER "ENERCHEM REFINER", OCTOBER 5, 1988.

REPORT No. 524

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INVESTIGATION REPORT INTO THE CIRCUMSTANCES ATTENDING THE STRIKING OF EAST OUTER CHANNEL LIGHT STRUCTURE NO. 1, IN THE AMERICAN SECTION OF LAKE ERIE BY THE CANADIAN TANKER "ENERCHEM REFINER", OCTOBER 5, 1988.

Particulars of vessel

Name	"ENERCHEM REFINER" ex "INDUSTRIAL TRANSPORT" (1987)
Official Number	329353
Port of Registry	Toronto
Call Sign	VXMS
Gross Tonnage	4,981.63
Net Tonnage	3,629.67
Length	115.52 m
Breadth	16.79 m
Depth	8.32 m
Draught	Forward: 3.35 m Aft: 5.48 m
Built	1969, Lauzon, Qc.
Type	Tanker
Propulsion	Two 10 cylinder opposed piston Fairbanks Morse 38D8 diesel engines, driving twin fixed-pitch propellers, with a rating of 2,450 kW. The engines are controllable from the wheel-house.
Crew	21
Owner	Enerchem Transport Inc. Montreal, Qc.

Navigating Equipment

Radar 1	Anritsu AR-L32
Radar 2	Decca RM-1226
Echo Sounder	Simrad

Loran C	Internav LC-300
SSB R/T	One
VHF/R/T	Sailor
Gyro Compass	Sperry
Magnetic Compass	One
Auto Pilot	One
Direction Finder	Marconi

Vessel Description

The "ENERCHEM REFINER" is a tanker engaged in the transportation of petroleum products on the Great Lakes and St. Lawrence River.

The bridge, engine-room and accommodation are all located aft.

At the fore-part of the vessel are the fore peak tank, used for water ballast, and the chain locker, both forward of the collision bulkhead. Aft of the collision bulkhead, between frames 165 and 153 are a pump-machinery-room and a pump-room.

The vessel is classed Home Trade 2 and all required certificates were on board and valid.

Note: All times mentioned in this report are Eastern Daylight Saving Time (UTC minus four hours).

Background

The "ENERCHEM REFINER" departed from Oswego, NY at 0746, October 4, 1988 bound for Sarnia.

After an uneventful voyage across Lake Ontario, through the Welland Canal and across Lake Erie, the vessel was approaching the Detroit River in clear weather during the evening of October 5.

The watch officer had the conduct of the vessel with the master on the bridge monitoring his performance. A quarter-master was at the wheel with the vessel in the manual steering mode.

At 2125, the vessel struck the structure of No. 1 light

of the outer channel in position 41°54'49"N, 83°06'25"W. She was reversed clear of the structure safely but had sustained heavy damage to her bow area and inflicted considerable damage to the structure.

After ascertaining her watertight integrity, the vessel continued her voyage to Sarnia for further inspection prior to proceeding to Quebec for permanent repairs. Costs for repairs to the vessel and the light structure are in the order of 1½ million dollars.

There were neither injuries nor pollution as a result of this casualty.

Narrative

The Canadian tanker "ENERCHEM REFINER" departed from Oswego, New York at 0745, October 4, 1988 bound for Sarnia, Ontario.

On board was a crew of 21 and there were approximately 4,000 tonnes of water ballast in Nos. 2, 4 and 6 port and starboard cargo tanks. The departure draught was 3.35 m forward and 5.48 m aft.

The voyage proceeded without incident across Lake Ontario and the Welland canal was cleared at 0350, October 5. Lake Erie was transitted in fair weather with good visibility.

At 1955, October 5, the oncoming watch officer (OOW) went to the wheel-house to acquaint himself with the position of the vessel, course and speed and the navigational equipment in operation. The watch was duly handed over at 2000 with the vessel in the automatic steering mode heading on a course of 276°(True) and (Gyro) with no notable gyro error.

Both radars were in operation and both were on the 6 mile range in the gyro-unstabilized mode. The wheel-house unit was later adjusted to the 3 mile range as the vessel neared No. 1 light.

At 2030, Colchester reef light was abeam to starboard at 2.2 miles positioning the vessel slightly south of her intended track. This position was marked on the chart but not entered into the wheel-house log-book. The master came to the bridge at about this time and, after observing the progress of the vessel, he left after ten minutes.

At 2055, Middle Sister Island light was abeam to port at

3.1 miles and when this position was plotted on the chart, the vessel had maintained her course, slightly to the south of the track. The speed over the ground from 2030 to 2055 was 10.2 knots and East Outer Channel light was directly ahead at 5.1 miles.

At 2100, a further position was plotted on the chart and this indicated that the vessel was being set to the southward. The weather conditions at this time were fine and clear with a northerly wind at 25 knots and a slight sea.

Shortly after 2100, the course was adjusted to 278°(T) & (G) and the vessel was put in the manual steering mode at 2105. At the same time, the master returned to the bridge to monitor the vessel's progress. The OOW was advised that when the flashing red light buoy No. 2 (LL 625) was 45° on the starboard bow, he should begin the starboard alteration which would eventually bring the vessel to a course of 344°(T) heading up the East Outer Channel of the Detroit River. He was also advised that if there was a downbound vessel in the channel, it was normal to start the course alteration sooner. However, such was not the case in this instance.

At 2120, a position established the vessel at 1 mile from No. 1 light and the master was reportedly advised of this. At this juncture, the master went to the adjoining chart-room to check if there were any recent Notices to Mariners affecting the immediate area.

When he returned, he observed No. 1 light to be close but understood the OOW to have the conduct of the vessel.

The OOW meanwhile, noticed that No. 2 light buoy was now on the starboard beam. He glanced at the radar screen and was reportedly about to remark to the master about altering course when the order 'hard-a-starboard' was given by the master.

This order however, was far too late and the vessel struck No. 1 light structure at full speed at 2125. The engines were stopped and then put to dead slow astern until the vessel was clear of the light structure, at which time the engines were again stopped.

An assessment was made of the damage and reports were passed to the USCG at Toledo and the CCG at Sarnia.

After determining that the vessel was fit to proceed and that there was no pollution, permission was granted by the authorities at 2300 for the vessel to proceed to Sarnia for inspection where she arrived at 0900, October 6.

Analysis

1. Environmental Conditions

The log entry at 2100 indicated a northerly wind of 25 knots and mostly clear skies. At the time of the grounding, there was no appreciable change and, although dark, the visibility was estimated to be 15 miles. The weather conditions, therefore, cannot be considered to be contributory to this casualty.

2. Watchkeeping

The vessel was maintaining the customary three watch system with an OOW and two deckhands on each watch maintaining a 4 hour on, 8 hour off rotation. The regular watchkeepers were, therefore, well rested.

The master had been on the bridge throughout the transit of the Welland Canal from approximately 1800, October 4 until 0500, October 5. He rested during the daylight hours of October 5 and did not feel unduly fatigued at the time of the approach to the Detroit River.

During the time that the vessel is in the automatic steering mode, one deckhand remains on the bridge acting as an additional lookout.

When the vessel was placed in the manual steering mode, October 5, the visibility was such that no additional lookout was deemed necessary as the master and the OOW were present on the bridge.

3. Standing Orders

The vessel's owners have explicit standing orders on all their vessels. Paragraph 17 of these orders states that a copy is to be kept in the vessels Deck Log Book and is to be signed by deck officers as having been read and understood. The OOW at the time of the casualty had signed the orders aboard the "ENERCHEM REFINER", dated July 10, 1988.

Paragraph 14 states that when the master either takes over or relinquishes the handling of the vessel, he shall clearly indicate this to the OOW. Until such time as he does so, the OOW is to carry out his responsibilities as the situation dictates. There is no evidence from either the OOW or the master that any such indication was given to the OOW by the master nor reportedly was it the intent of the master to take over the conduct

of the vessel.

Similarly, paragraph 6.(1)(a)(v) of the Charts and Publications Regulations states the requirement for all ships to make proper navigational use of the Code of Nautical Procedures and Practices, 1985.

Contained within that publication under Part 1, Section 8, Navigational duties and responsibilities, states:

(a) The officer in charge of the watch shall:

(ii) continue to be responsible for the safe navigation of the ship, despite the presence of the master on the bridge, until the master informs him specifically that he has assumed that responsibility and this is mutually understood;

(iii) notify the master when in any doubt as to what action to take in the interest of safety.

Neither of these basic principles appears to have been observed by the OOW.

4. Officer Evaluation

Although the OOW had previously sailed with the same master for a year, it was in the capacity of quartermaster and on another vessel.

The OOW had been employed on the "ENERCHEM REFINER", in the capacity of a watchkeeping officer, for six months while the master joined the same vessel only six days before the casualty.

Consequently, the master was intent on monitoring the performance of his OOW and this can be considered to be a normal undertaking when a shipmaster wishes to appraise his officers.

The OOW, on the other hand, had never before retained the conduct of the vessel when navigating in confined waters. This responsibility had been undertaken by either the master or a senior officer who had explained their actions as the vessel progressed.

On this particular occasion, therefore, the OOW assumed that the master had in fact taken over the conduct of the vessel without confirming that the master had

accepted the responsibility. Hence the OOW's lack of action at the prescribed alter course position.

5. The Quartermaster

When the vessel was put in the manual steering mode at approximately 2105, the quartermaster was initially ordered to steer 278° and soon thereafter to steer on the No. 1 light. These instructions were apparently carried out and a good course was steered. From the steering position, the quartermaster could see the light but not its structure.

6. Radar Equipment

The "ENERCHEM REFINER" is fitted with two radar units. An Anritsu AR-L32 is located on the port side of the steering position and is reportedly used for river pilotage. This set was in good working order when examined during this investigation. It is designed to operate in 'ship's head up' mode only.

A Decca RM-1226 is located on the port side of the chart table and is reportedly used for lake navigation. It is gyro-stabilized and both 'ship's head up' and 'north up' modes are available. This set was also in good working order upon examination. No interference was observed when both sets were operating simultaneously.

7. Events following the striking

After reversing clear of the light structure and coming to rest, a damage assessment was made. Initially, it was determined that the bow was severely damaged with the forepeak ruptured and open to the sea. Soundings revealed that all other compartments were dry. All equipment was then tested, with a view to proceeding, and all was found to be operating normally. The information was transmitted to the USCG at Toledo and the CCG at Sarnia.

Water ballast was transferred from No. 2 to No. 6 cargo tank to raise the bow and initially, the after draught was brought to 6.4 metres for the passage to Sarnia.

At 2345, the vessel was underway to Sarnia with the engines at slow ahead. A continuous check was made for leakage as the speed of the vessel was gradually increased to full ahead. No leaks were discovered but a watchman remained on the bow throughout the passage and a constant check of the forepeak compartment was

maintained.

The vessel arrived at the Government dock at Sarnia at 0945, October 6 where she was boarded by Government and owners' representatives.

Following discussions on the availability of ship repairers, it was decided to send the vessel to the shipyard at Lauzon, PQ.

The after draught was increased to 7.16 m thereby lifting the fore part higher out of the water and, following clearance to proceed from the Ship Safety Branch of the CCG, the "ENERCHEM REFINER" departed from Sarnia at 0050, October 7 and subsequently arrived at Lauzon at 1445, October 13. The vessel re-entered service November 22 following repair work at a cost of some $650,000.

8. Damage

The following damage was observed on-site at Lauzon:

- the stem was demolished;
- plating and structure on both sides in way of the forecastle and forepeak were warped and crushed against the forward bulkhead of the chain locker, frame 168;
- the forward bulkhead of the chain locker was holed at the bottom part into the false floor beneath, frame 168;
- below the chain locker, the forepeak was crushed back to the collision bulkhead, frame 165;
- slight damage to the dry double-bottom tank aft of the collision bulkhead, and
- slight damage to the hawse pipes and anchor-pockets.

9. The light structure

East Outer Channel Light (USLL 6485, CAN LL 624) is a white cylindrical tower 13.4 m high on a concrete platform 4 m high. A battery-room is also located on the platform.

On October 10, 1986 the structure was struck by a vessel and sustained damage with a repair cost of US $501,000. Repairs were not completed until August 1988.

A summary damage report by the USCG following the casualty which is the subject of this report, indicated that the battery-room, tower and all associated equipment was completely missing from the structure. The concrete deck disintegrated approximately 150 mm below the base of the battery-room. A metal sleeve had crumpled at the point of impact and the access railing was sheared and bent.

A diver's report indicated that there was considerable underwater damage and the remaining structure is leaning approximately 3° from its vertical axis. An initial repair cost has been estimated at US $700,000.

10. Personnel

The Master holds a Foreign-Going Master's Certificate issued at Halifax, NS, in 1961 and has both oil tanker and chemical tanker endorsements to his certificate. He also holds a Radiotelephone Operator's Restricted Certificate (Maritime), RORC (M), and has completed a course in marine emergency duties. He has been at sea for 45 years, having served his time in convey escort vessels in the North Atlantic during World War II, and has sailed as master for 29 years. He joined the "ENERCHEM REFINER" just 6 days prior to the casualty.

The OOW holds an ON2 certificate issued at Montreal in 1987 with oil tanker endorsement. He also holds an RORC(M) and has completed a course in marine emergency duties. He has been at sea for 23 years having sailed as a watchkeeping officer for 6 years. He joined the "ENERCHEM REFINER" in 1985 as an AB and in 1986 was appointed as a deck officer for two months. He rejoined the vessel as a deck officer in July 1988.

The quartermaster holds a Canadian Watchkeeping Certificate issued at Montreal in 1986 and also holds an RORC(M) and has completed the first course in marine emergency duties. He has been at sea for 11 years including 1 year as quartermaster most of which time has been on the "ENERCHEM REFINER".

Findings

The Canadian tanker "ENERCHEM REFINER" struck East Outer Channel No. 1 light structure at full speed in clear though dark conditions due to not altering course at the prescribed position.

It would appear that the following factors contributed

to this casualty:

- lack of communication between the master and the OOW, resulting in a misunderstanding as to who had the conduct of the vessel;

- the officers did not recognize the developing dangerous situation until too late; and

- the OOW's limited experience in that capacity in confined waters.

Other Findings

At the time of the casualty the OOW remained under the informal training/guidance of the master.

As the conduct of the vessel had not been officially handed over to the master, both Company Standing Orders and the Recommended Code of Nautical Practices and Procedures specify that the responsibility to alter course remained with the OOW.

MARINE CASUALTY INVESTIGATIONS
TRANSPORT CANADA
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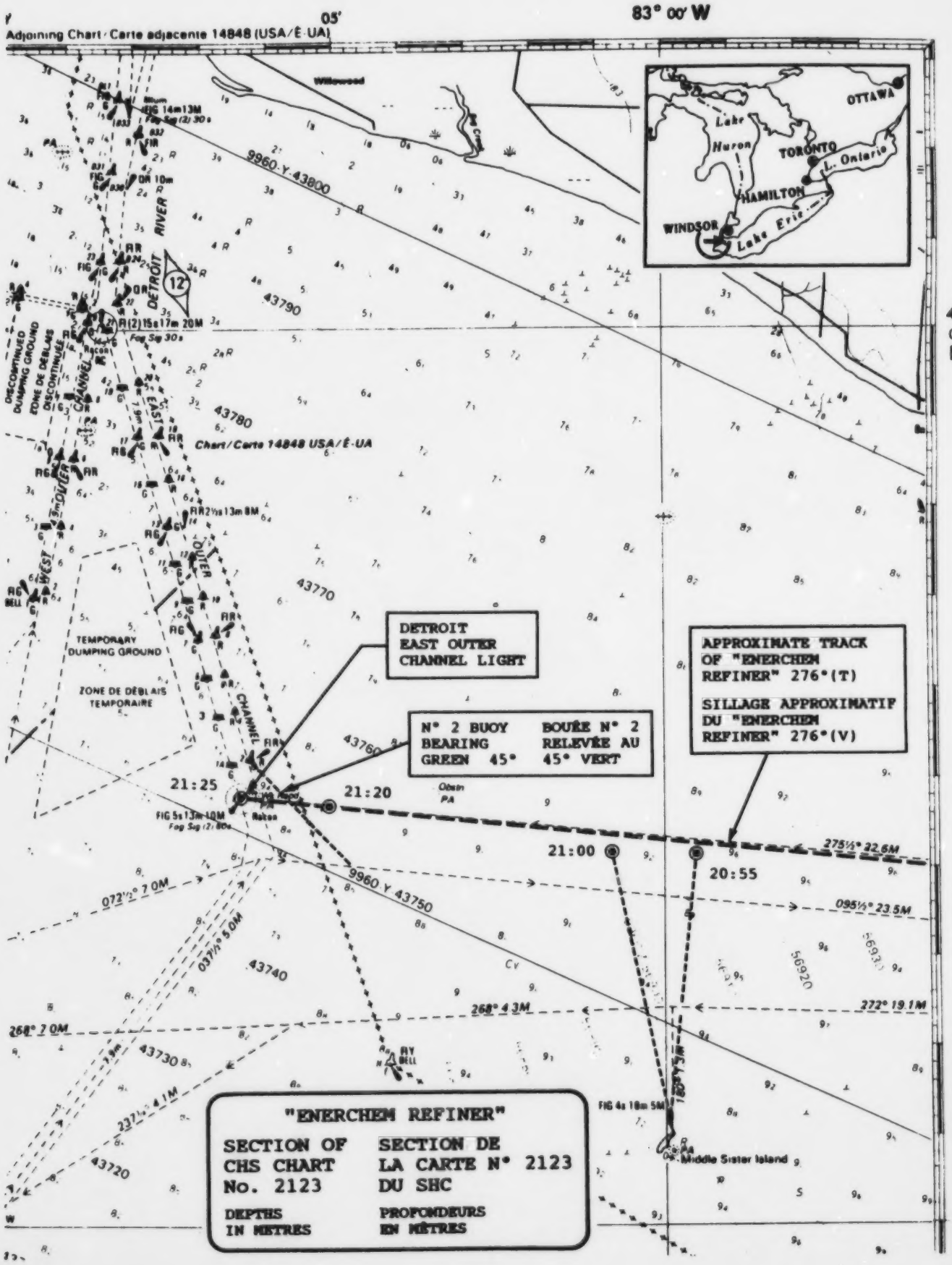
OTTAWA, ONTARIO
K1A 0N5

OTTAWA, ONTARIO
MAY, 1989.


05'
83° 00' W
Adjoining Chart / Carte adjacente 14848 (USA/É-UA)
42° 00' N
55'
50'
Adjoining Chart / Carte adjacente 2122
OTTAWA
Lake Huron
TORONTO
L. Ontario
HAMILTON
WINDSOR
Lake Erie
DETROIT RIVER
DISCONTINUED DUMPING GROUND
ZONE DE DÉBLAIS DISCONTINUÉE
EAST CHANNEL
WEST CHANNEL
TEMPORARY DUMPING GROUND
ZONE DE DÉBLAIS TEMPORAIRE
Chart / Carte 14848 USA/É-UA
9960 Y 43800
9960 Y 43750
43790
43780
43770
43760
43740
43730
43720
DETROIT EAST OUTER CHANNEL LIGHT
N° 2 BUOY BEARING GREEN 45°
BOUÉE N° 2 RELEVÉE AU 45° VERT
APPROXIMATE TRACK OF "ENERCHEM REFINER" 276°(T)
SILLAGE APPROXIMATIF DU "ENERCHEM REFINER" 276°(V)
21:25
21:20
21:00
20:55
275½° 22.6M
095½° 23.5M
272° 19.1M
268° 4.3M
268° 7.0M
072½° 7.0M
037½° 5.0M
237½° 4.1M
Obstn PA
Middle Sister Island
"ENERCHEM REFINER"
SECTION OF CHS CHART No. 2123
SECTION DE LA CARTE N° 2123 DU SHC
DEPTHS IN METRES
PROFONDEURS EN MÈTRES

"ENERCHEM REFINER"

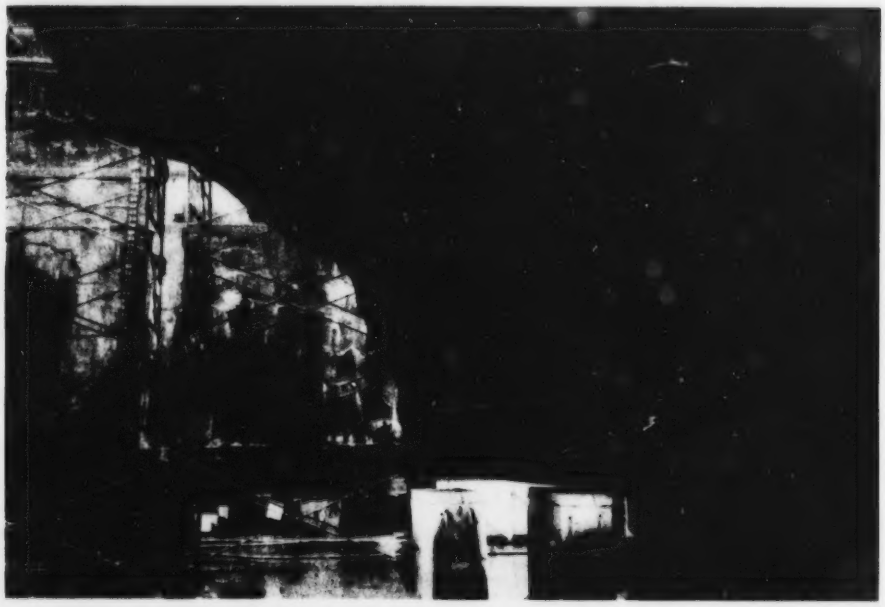
View of damage to bow section.
Vue des avaries de la partie avant.

"ENERCHEM REFINER"

View of damage to bow section.

Vue des avaries de la partie avant.

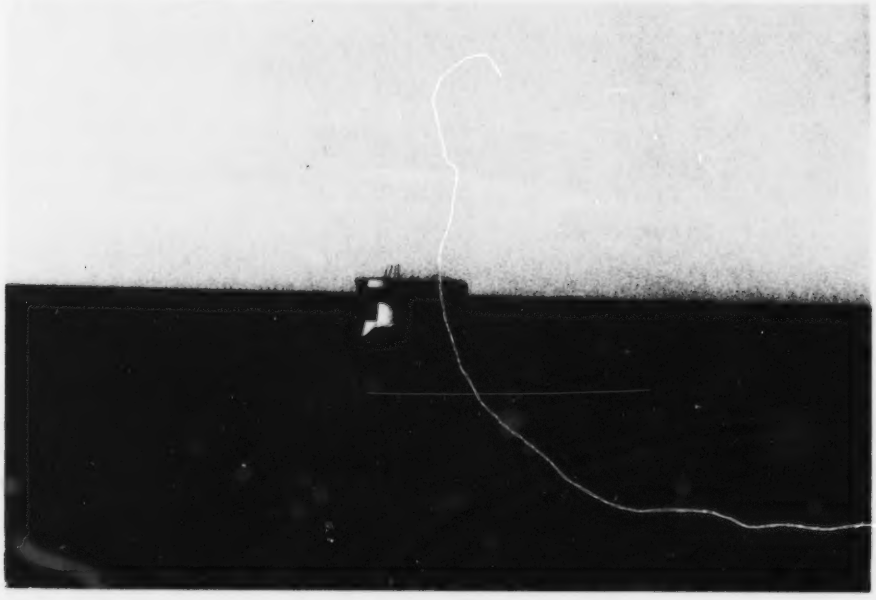
"ENERCHEM REFINER"



View of damage to bow section with frames indicated.

Vue des avaries à la partie avant ainsi que l'identification des couples.

"ENERCHEM REFINER"



Detroit East Outer Light No. 1 before and after being hit by "ENERCHEM REFINER".

Detroit East Outer Light No. 1 avant et après le heurt du "ENERCHEM REFINER"